Best Management Practices Plan for Exploration in Alaska OCS by the Drillship

M/V Noble Discoverer

HSE 0000, DRAFT - Revision 2.0
Effective: March 2012

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1.0 Policy Statement

BMP Policy Statement

Best management practices (BMPs) have been developed and implemented on the drillship M/V Noble Discoverer (*Discoverer)* to control and minimize waste generated and discharged during drilling exploration activities offshore of the Continental Shelf in Arctic Alaska. These practices are part of the pollution prevention program on the *Discoverer* resulting in (1) savings in materials, pollution control, and liability costs; (2) enhanced work environment safety; and (3) increased efficiencies.

This BMP plan will be improved continuously with the goal of always controlling generated waste and reducing liquid and solid discharges. BMPs include guidelines for good housekeeping, equipment maintenance and operation, cleanup of spills and leaks, inspections, recordkeeping and training.

2.0 Certification Statements

Certification by BMP Developers & Implementers

The annual NPDES review of this BMP Plan and audit of the *Discoverer* has been completed by Shell and its contractors and as applicable, any other individuals responsible for the development and implementation of the BMP Plan. This BMP Plan and yearly annual review (conducted in April 2012) fulfills the requirements for BMP Plans at 40 CFR 435, AKG280000 NPDES General Permits, and the guidelines of EPA's Guidance Manual for Developing Best Management Practices.

Name	Title	Signature	Date

3.0 Facility Security and Effluent Risk Assessment

This section identifies Shell as the operator for the exploration program and the contracted use of the drill ship, *Discoverer* in the Chukchi Sea. Policies and procedures addressing facility security, effluent risk assessment and hazardous material handling are discussed here as it applies to the Arctic General NPDES discharge program. Specific corporate policies, training manuals/programs, safety & environmental risk assessments and compliance tracking systems as it applies to all Oil and Gas Exploration Operations can be obtained from Noble Corporation, Shell Regulatory Affairs Department and the drilling fluids contractor.

3.1 Operating Company

Shell Gulf of Mexico Inc. (Shell) is the operating company for the Exploration Program and holds the NPDES permit(s) for wastewater discharges into Arctic OCS waters. The facility location, permittee name, and facility (rig) owner are listed below:

Table 3.1 Operating Company

Facility Location	Within the Burger Prospect of the Chukchi Sea
NPDES General Permit Number	NPDES General Permit Alaska OCS (AKG280000) published on June 26, 2006. Permit number per well is specified in Section 4.1.
NPDES Permittee	Shell Gulf of Mexico Inc. (Shell)
Facility (Rig) Owner	Noble Drilling Holding LLC
Facility Name	M/V Noble Discoverer (*Discoverer)*

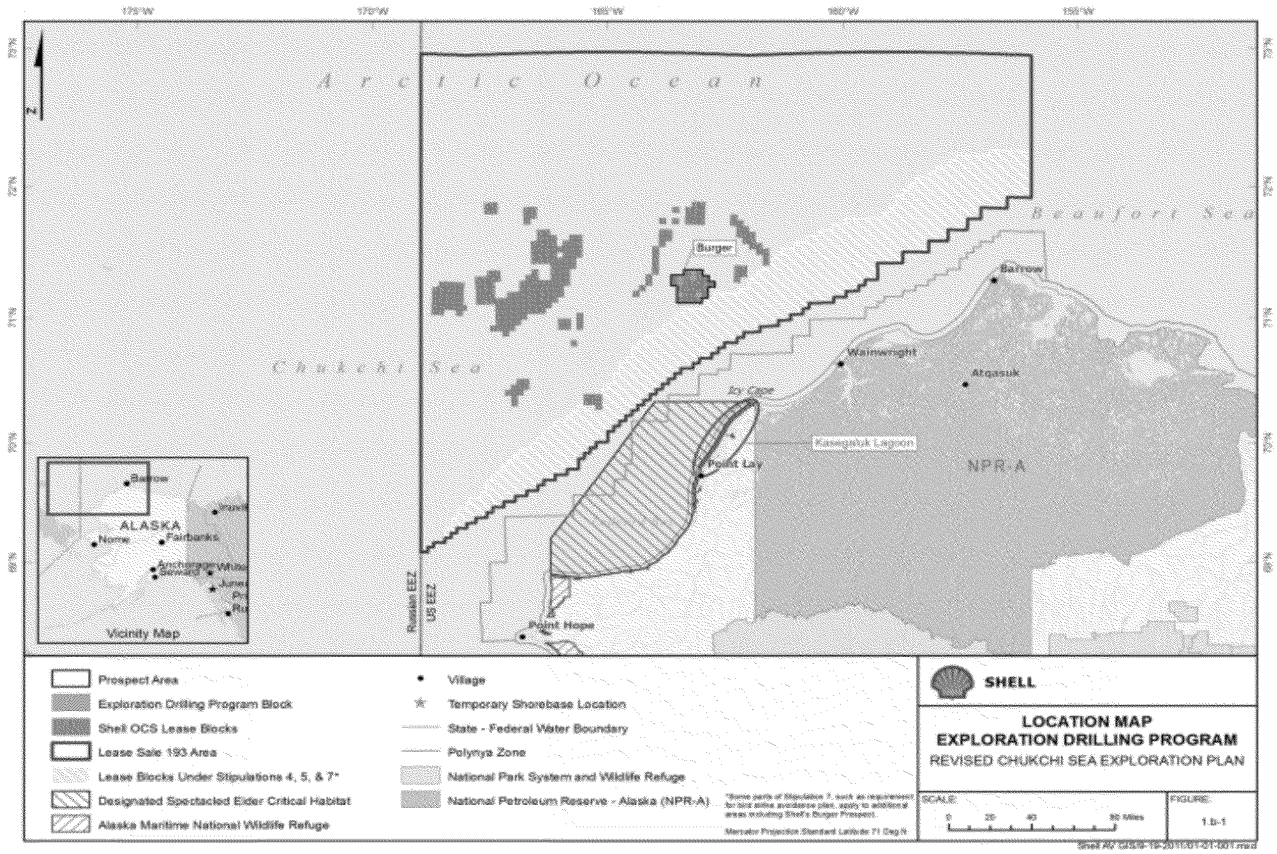
The M/V Noble Discoverer (*Discoverer*) is a true offshore oil and gas drillship adapted for operation under Arctic conditions. The *Discoverer* is an anchored drillship with an 8-point anchored mooring system. The hull has been reinforced for ice resistance. The *Discoverer* has all necessary drilling equipment and ancillary facilities to explore and complete exploratory wells in the Beaufort and Chukchi Seas in the North of Alaska. The key components of the *Discoverer* include:

- Living quarters for approximately 124 people
- Mud treatment equipment
- Chemical storage area
- Drinking water treatment system
- Marine sanitation device
- Oil/water separators

3.2 Location and Security

Shell plans to drill six exploration wells in the Burger Prospect of the Chukchi Sea. All of these six possible drill sites will be permitted for drilling in the initial year to allow for operational flexibility in the event sea ice conditions prevent access to one or more locations. The prospect location is depicted in the map to follow.

Shell and Noble Corporation have security plans in place that restrict access to the *Discoverer* and provide training on security measures to all employees with access to the ship. Detailed security plans may be available for review upon request from Shell Regulatory Affairs Department. Aboard the ship, management of security is handled by the Noble Corporation.



3.3 Facility and Planned Support

Layouts diagrams and plan views for the *Discoverer* and a detailed site description are contained in the Oil Discharge Prevention and Contingency Plan (ODPCP). Discharge Flow Diagrams associated with the Oil and Gas Exploration National Pollutant Discharge Elimination System (NPDES) permit will be available electronically and in hard copy in Anchorage and aboard the vessel (See Appendix D).

During exploration drilling operations, the *Discoverer* and the *Kulluk* will be attended by a minimum of 11 vessels that will be used for ice management, anchor handling/ice management, OSR, refueling, resupply, waste removal, and servicing of the drilling operations.(See Table 3.2)

Table 3.2 Planned Support for the *Kulluk* or *Discoverer*

Support Vessel (or similar)	*Kulluk or Discoverer*
Primary Ice Management	*Nordica*
Secondary Ice Management / Anchor Handling	*Hull 247* (also acts as tow vessel for the *Kulluk* and a berthing vessel for OSR)
Shallow water resupply	*Arctic Seal*
Offshore Resupply Vessel (OSV)	*Harvey Spirit*
Waste Streams Transfer Vessel	*Carol Chouest*
Waste Streams Temporary Storage and Transit to Disposal Facility (deck barge and tug; [deck barge])	*Southeast Provider* and *Ocean Ranger**
Waste storage barge and tug (waste barge)	To be determined
Primary Oil Spill Response (OSR)	*Point Oliktok* Tug and *Endeavor* Barge
OSR Liquid Storage and Refuel Supply Vessel	*Mikhail Ulyanov*
OSR Containment System	Invader Class tug and barge
Anchor Handler – support for the Containment System Barge	To be determined

3.4 Material Compatibility and Storage

Proper storage and handling of laboratory and industrial chemicals will reduce the potential for personal and environmental accidents. Four basic principles will be followed for chemical use on the *Discoverer*:

- store the least amount of chemicals necessary,
- segregate incompatible chemicals,
- use personal protective equipment (PPE) when identified on the MSDS, and
- ensure adequate spill response/clean-up materials are accessible.

Storage requirements for chemicals aboard the *Discoverer* include:

1. Flammable liquids will be stored in metal cabinets away from heat or ignition sources and provided with proper ventilation.
2. Bases and acids will be stored separately.
3. Oxidizers will be separated from organic compounds.
4. Special precautions will be taken for peroxides, peroxide forming compounds and especially organic peroxides.
5. Chemicals reactive with water or air (such as sodium or phosphorus) will have special handling and storage according to labeling and the MSDS.

6. Gas cylinders will be properly labeled and double fastened to the wall or cabinet that has been bolted to the floor. Also, cylinders will be capped when not being used to protect the stem.

Acutely hazardous chemicals require special handling and storage. Those handling chemicals aboard the *Discoverer* will have the training, knowledge and appropriate PPE for safe use and handling. For storage purposes, often a secondary container can provide the protective barrier between incompatible chemicals. The Material Safety Data Sheet (MSDS) provides guidance for storage and handling as well as spill clean-up procedures.

Drilling Fluids Materials Safety Data Sheets aboard the *Discoverer* are provided in Section 17. Shell Regulatory Affairs Department, Noble Corporation and the drilling fluids contractor can provide additional trainings manuals and information for their respective employee use.

3.5 Effluent Characterization

For the purpose of this document, an effluent is a regulated and discharged wastewater or water. Each effluent is characterized as provided in the table below. Only pollutants which require routine monitoring or are present at significant concentrations have been listed. The volume and concentration of pollutants discharged varies over time to some extent depending on the activities at the facilities. The concentrations of pollutants are reported each month on the Discharge Monitoring Reports (DMR) and are submitted to EPA and Alaska Department of Environmental Conservation (ADEC).

Table 3.3 Discharge Constituents

No.	Discharge	Potential Constituents	Potential Pollutants	Discharge Frequency
001	Drilling Mud, Drill Cuttings	Water, cuttings, barite and mud chemicals	Metals, hydrocarbons, and suspended solids	Intermittent
002	Deck Drainage	Water, oil and grease, ethylene and tri-ethylene glycol, lubricants, fuels, biocides, surfactants, detergents, corrosion inhibitors, cleaners, solvents, paint cleaners, bleach, dispersants, coagulants, and other chemicals	Solids, oil and grease, hydrocarbons, metals	Daily
003	Sanitary Wastes	Housekeeping chemicals, chlorine, chlorine scavenger	BOD, solids, chlorine	Daily
004	Domestic Wastes	Wash water, laundry soap, cleansers, and other housekeeping chemicals	Solids, foam	Daily
005-013	Miscellaneous Discharges	Sea water, scale inhibitor, corrosion inhibitor, biocide, flocculent, oxygen scavenger	Sheen, solids, chemicals	Daily

Further description of the effluents can be found in Section 5.

3.6 Effluent Disposal

Aboard the *Discoverer*, the discharge caisson is the primary point for all wastewater discharge. The discharge caisson is a pipe that runs vertically through the sponson on the hull of the drillship from the main deck level to the base of the sponson. The sponson is an exterior reinforced cladding installed on the *Discoverer* to provide ice resistance. It is hollow and extends from the main deck level to the water line.

Waste streams are collected aboard the drillship to a point on the main deck near the mud room. A 15-inch-diameter pipe exits the hull, turns downward, and is connected to the top of the discharge caisson.

The discharge caisson, also a 15-inch-OD pipe, is welded into the sponson top and bottom (so that the interior of the sponson remains dry). The bottom of the sponson and the end of the discharge caisson is 5.6 ft (1.7m) above the keel depth, and since it remains open to the sea at all times, the discharge caisson is constantly filled with water to mean sea level. This caisson is not equipped with a "float" valve; it is open to the sea through which most waste streams are discharged below sea level.

The *Discoverer* has the following draft characteristics:

Max draft at load line:	27ft (8.2 m)
Transit draft	16.3 ft (8.0 m)
Drilling draft	25.2 ft (7.7 m)
Light ship draft	19.0 ft (5.8 m)

With the bottom of the sponson 5.6 ft above the keel, the base of the discharge caisson while drilling is 25.2 ft – 5.6 ft = 19.6 ft (6.0 m) below mean sea level. Because of heave, the water level inside the caisson is constantly changing.

4.0 Wells & Discharges Covered by BMP Plan

4.1 Current Wells Covered by BMP Plan

Table 4.1 Shell Exploration Wells

BMP Rev.	Wells Covered by Plan (enter WBM well)	Area	Lease Block (Surface)	OCS-Y Number	NPDES Specific Permit Number
2	Burger A	Posey	6764	OCS-Y-2280	AKG280005
2	Burger F	Posey	6714	OCS-Y-2267	AKG280006
2	Burger J	Posey	6912	OCS-Y-2321	AKG280004
2	Burger R	Posey	6812	OCS-Y-2294	AKG280013
2	Burger S	Posey	6762	OCS-Y-2278	AKG280014
2	Burger V	Posey	6915	OCS-Y-2324	AKG280019

4.2 Discharges Covered by BMP Plan

All discharges into the water will be regulated by the United States Environmental Protection Agency (EPA) through NPDES (National Pollutant Discharge Elimination System) permits and by 40 CFR (Code of Federal Regulations) Part 435. Permitted fluids listed in the Alaska NPDES permit for Oil and Gas facilities on the Outer Continental Shelf and contiguous State Waters include:

Discharge Number	Discharge Description
001	Water- Based Drilling Fluids and Drill Cuttings
002	Deck Drainage
003	Sanitary Wastes
004	Domestic Wastes
005	Desalination Unit Wastes
006	Blowout Preventer Fluid
007	Boiler Blowdown
008	Fire Control System Test Water
009	Non-Contact Cooling Water
010	Uncontaminated Ballast Water
011	Bilge Water
012	Excess Cement Slurry
013	Muds, Cuttings, Cement at Sea Floor
014	Test Fluids*

Definitions for the above discharges, provided below, are from: 40 CFR 435 and the ALASKA NPDES General Permit 280000.

***Note: Under this General Permit (AKG-28-0000), no discharge of Test Fluids will occur.**

ALASKA NPDES Key Permit Definition:

Drill Cuttings means particles generated by drilling into subsurface geological formations and carried out from the well bore with the drilling fluids.

Drilling fluids means the circulating fluid (mud) used in the drilling of wells to clean and condition the hole and to counterbalance formation pressure. The classes of drilling fluids are water-based fluids and non-aqueous drilling fluid.

Test fluids mean the discharge that would occur should hydrocarbons be located during exploratory drilling and tested from formation pressure and content. This would consist of fluids sent down hole during testing along with water from the formation.

Water-based drilling fluids means "drilling fluids" that have water as its continuous phase and the suspending medium for solids, whether or not oil is present.

5.0 Discharge Limits and Monitoring

This chapter describes the discharge limits for each effluent stream, how effluents will be monitored, and what actions are required if permit limits are exceeded. Chukchi Sea discharge monitoring must currently follow the procedures specified in Alaska NPDES AKG280000.

5.1 Discharge Limits and Monitoring Schedule

Authorized discharge, particularly water based mud (WBM) and cuttings monitoring must be conducted at all times, in accordance with the NPDES permit, during exploratory drilling operation and discharge. Monitoring schedule and applicable discharge limits are shown in the table below.

Table 5.1 All Discharges and Muds/Drill Cuttings Waste*

Discharge	Pollutant Parameter	Effluent Limitations	Monitoring Requirements	Comments
All Discharges	pH	6.5-8.5	Monthly	**Note:** Seasonal and depth related restrictions may apply. Refer to Table 2, page 23 of AKG280000
Discharge 001 Water-Based Drilling Fluids and Drill Cuttings	SPP toxicity	96 hour LC50 >30,000 ppm	Monthly	
	Drilling fluids and cuttings	No visible sheen and static sheen test	Daily	
	Free oil	No visible sheen and static sheen test	Daily	
	Diesel oil	No visible sheen and static sheen test	Daily	
	Mercury in Barite	1 mg/kg	Annual	
	Cadmium in Barite	3 mg/kg	Annual	
	Chromium VI	---ug/l	Once per well	
	Silver	---ug/l	Once per well	
	Thallium	---ug/l	Once per well	
	Total Aqueous Hydrocarbons	-- micro g/l	Once per well	
	Total Aromatic Hydrocarbon	-- micro g/l	Once per well	
	Total volume	>5-20m 500 bbl/h >20-40m 750 bbl/h >40m 1000 bbl/h	Hourly during discharge	

***Note: For the purposes of this BMP Plan, Drilling Fluids and Drilling Cuttings are WBM and therefore mean the same thing. The words mud, drilling mud, and drilling fluid refer only to water-based drilling fluids.**

Table 5.2 Deck Drainage Effluent

Discharge	Pollutant Parameter	Effluent Limitations	Monitoring Requirements	Comments
Discharge 002 Deck Drainage	Free oil	No visible sheen and static sheen test	Daily	
	Flow volume (mgd)	-	Monthly estimate	Estimate
	Total aqueous hydrocarbons (TAqh)	--µg/l	Once per discharge event	
	Total aromatic hydrocarbons (TAH)	--µg/l	Once per discharge event	

Table 5.3 Sanitary and Domestic Wastes

Discharge	Pollutant Parameter	Effluent Limitations	Monitoring Requirements	Comments
Discharge 003 Sanitary Wastes Beyond Alaska Waters (OCS)	Flow (mgd)	---	Daily measured/ recorded	
	BOD	30 mg/l monthly average 60 mg/l daily limit	Weekly	
	TSS	30 mg/l monthly average 60 mg/l daily limit	Weekly	
	Floating solids	No discharge	Daily	
	Foam	No discharge	Daily	
	Oily Sheen	No discharge	Daily	
	pH	6.0-9.0	Monthly	
	Fecal Coliform Bacteria	100 colonies/100ml Average Monthly; 200 colonies/100 ml Maximum Daily Limit	Monthly	
	Total Residual Chlorine	0.5 mg/l Average Monthly Limit; 1.0 mg/l Maximum Daily Limit	Weekly	
Discharge 004 Domestic Waste	Floating solids, garbage, foam	No discharge	Daily	
	Flow volume (mgd)	---	Monthly estimate	

Table 5.4 Desalination Unit and Miscellaneous Effluent Discharges

Discharge	Pollutant Parameter	Effluent Limitations	Monitoring Requirements	Comments
Discharge 005 Desalination Unit Wastes	Free oil	No visible sheen and static sheen test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 006 BOP Fluid	Free oil	No visible sheen and static sheen test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 007 Boiler Blowdown	Free oil	No visible sheen and static sheen test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 008 Fire Control System	Free oil	No visible sheen and static sheen test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 009 Non-Contact Cooling Water	Free oil	No visible sheen and static test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 010 Uncontaminated Ballast Water	Free oil	No visible sheen and static test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 011 Bilge Water	Free oil	No visible sheen and static test	Once/discharge	Must pass through an oil-water separator
	Flow volume (mgd)	-	Monthly estimate	
Discharge 012 Excess Cement Slurry	Free oil	No visible sheen and static sheen test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	
Discharge 013 Mud, Cuttings & Cement at Sea Floor	Free oil	No visible sheen and static sheen test	Once/discharge	
	Flow volume (mgd)	-	Monthly estimate	

5.2 Waste Minimization

Waste minimization utilizes source reduction, recycling, and reuse to prevent pollution prior to its generation. Source Reduction includes, but is not limited to, process modification, raw material substitution, and energy conservation which lead to a reduction in the amount and/or toxicity of a process residual. It can be achieved by using chemicals effectively and operating and maintaining treatment systems according to equipment manuals. Recycle and Reuse involves the reclamation or reuse of process residuals for beneficial purposes. Useful constituents of a residual, such as hydrocarbons, may be reclaimed for reuse.

5.3 Discharge Security

Procedures and measures have been written to address the likelihood of an accidental discharge to the Chukchi Sea. General security items include: trained personnel, operating treatment systems, system isolation, sump alarms, lips in doorways, room alarms, automatic pumps, placards to promote awareness

of permit requirements, tags located on valves that could lead to potential discharges to the Chukchi Sea, and the storage of chemicals in suitable, closed containers. Placards are also posted on the facility identifying NPDES Observation Points where crew members conduct visual observations of the surface of the water during discharge.

5.4 Notifications

If any of the discharge limits are exceeded or if other suspected BMP Plan non-compliance or modification occurs, the Shell Regulatory Affairs Department must be called immediately.

If a NPDES non-compliance occurs, the Shell Alaska Regulatory Affairs Department will complete and file the necessary reports to the EPA in accordance with permit requirements.

5.5 Discharge Tracking Reports

The Shell Gulf of Mexico Inc. operator reporting system will track and maintain on-site documentation for authorized discharges. The forms utilized maintain a daily or weekly track record of key discharges directed to assess compliance and performance of drilling waste management during exploration activities. (Examples of these reports are provided in Appendix A.)

5.6 NPDES Monitoring Recording and Reporting Requirements

The Arctic Oil and Gas Exploration General NPDES permit requires that traceable records of routine and non-routine discharges be maintained. Monitoring results will be summarized in the DMR form (EPA No. 3320-1) or equivalent on a monthly basis, postmarked by the 10th day of the following month. Annual sampling results will be reported on the January DMR. All records of monitoring information shall be retained at least 5 years from the date of the sample, measurement, report, or application.

Non-compliance of the NPDES permit that may endanger health or the environment must be reported by telephone within 24 hours from the time of occurrence. This includes any bypass or upset that exceeds discharge limitation in the permit or any violation of maximum daily discharge limitation.

5.7 Specific NPDES Mineral Oil Pill Requirements

The Arctic Oil and Gas Exploration NPDES General Permit authorizes discharge of residual amounts of mud laden with mineral oil pills plus additives under the following conditions:

- At least 50-bbl buffer of drilling fluids on either side of the pill are removed from the circulating fluid system and not discharged to United States waters.
- Residual mineral oil concentration in the discharge drilling fluid should not exceed 2% v/v.

Procedures to address NPDES requirements are described in the Drilling Fluid Plan that addresses possible scenarios during drilling operation. Any exceedence of the above requirements must be reported to Shell Regulatory Affairs Department, which will handle reporting to the EPA.

6.0 Specific Best Management Practices for Waste Discharges

6.1 Drilling Fluids (Discharge 001)

Water-based drilling muds and cuttings can be directly discharged to Chukchi Sea at a depth-dependent discharge rate. Only drilling fluid additives that have been tested to pass the SPP toxicity test (list included in Drilling Fluids Plan) will be used in the well, reducing risk and costs associated with drilling fluid disposal.

Housekeeping measures ensure that:

- chemicals are stored in closed containers and the drilling floor is kept clean and organized.
- inspections will be performed weekly to identify potential spills and leaks and to verify chemical inventory.
- holding tanks are cleaned as needed, systems are flushed as needed, and piping and joints are repaired/replaced as needed.

The Drilling Foreman will control all chemicals added and will contact laboratory staff prior to any discharges. All drilling fluids are sheen-tested prior to discharge, and all chemicals go through a chemical review process before use. On-site monitoring is recorded daily. All laboratory and monitoring data is directly submitted to Shell Regulatory Affairs Department and Shells Wells Group.

6.2 Deck Drainage (Discharge 002)

Deck drainage systems are designed to capture spills, leaks, wash water, and storm water. The drainage is routed to a treatment system where the water and oil are separated. Deck drainage systems are spill containment measures employed in high-risk areas. Deck drainage is processed through an oil/water separator prior to discharge.

Housekeeping measures include:

- keeping the decks and floors clean of debris to prevent plugging of drains.
- using open-top containers to minimize/prevent accidental spills into deck drains.
- immediately containing and cleaning up spills to prevent contamination of drainage.
- periodically skimming from the surface of skim tanks to maintain treatment effectiveness and cleaning the skim tanks as needed.

The Drilling Foreman or designee will perform an annual inspection and periodic visual inspections for proper operation and inspect daily piping and joints to prevent spills or leaks. Deck drainage may be commingled with produced water, and discharge is recorded daily.

6.3 Sanitary Wastewater (Discharge 003)

Sanitary waste (black water) consists of human waste from toilets and urinals. The volume of these wastes varies with occupancy and treatment systems. A marine sanitation device (MSD) is used on the *Discoverer*. Most treatment systems use an electro-catalytic cell, which produces hypochlorite disinfectant from saltwater (seawater) and introduces it directly into the sewage stream. This production of disinfectant occurs as the stream is being passed between the charged cell plates causing an electrolytic breakdown of the organic molecules within the sewage stream. Thus, multiple groups of reactions occurring simultaneously cause rapid elimination of organic compounds and bacteria. The unit produces its own chemicals from the salt contained in seawater, and no additives are required.

Housekeeping measures include:

- Using only cleaners that are compatible with the treatment system.
- Treatment system is kept free of debris.
- If filters are used, they are periodically inspected and/or changed as required.
- Only marine biodegradable toilet paper is used.
- Salt is added to the MSD when freshwater is used.
- Amperage is checked regularly.
- The system is back-flushed, cells inspected, and flow rate observed as directed by manufacturer.

The Drilling Foreman or designee performs inspections of piping and joints to ensure placards are placed where needed and to ensure that valves and tagging exist to prevent spills and leaks. Sludge generated in the MSD will be removed per manufacturer maintenance protocol and disposed of in an approved disposal facility. Monitoring data is recorded.

6.4 Domestic Wastewater (Discharge 004)

Domestic wastewater (gray water) is defined as materials discharged from showers, sinks, safety showers, eye-wash stations, hand-wash stations, galleys, and laundries. It is also generated in food preparation areas. The volume of these wastes varies widely with time, occupancy, and site characteristics. Some domestic wastewater may be discharged directly into the Chukchi Sea while wastewater contaminated by oil, such as laundry facilities for oily clothes, is treated through the oil/water separator system.

Housekeeping measures include:

- Solid food is prevented from being washed down the sinks.
- Sinks with grease traps in place will prevent an oily sheen on discharge water; for sinks without grease traps, grease will be placed in solid waste receptacles.
- Grease traps are cleaned routinely or as needed.
- Incompatible cleaners are used separately and not mixed within a container.

The Drilling Foreman or designee will perform visual inspections daily to ensure foam or floating solids are not present and will inspect piping and joints to identify the potential for spills and leaks. Placards

will be placed at kitchen sinks identifying prohibited products and discharge guidelines. All on-site monitoring is recorded daily.

6.5 Miscellaneous Discharges (Discharges 005-013)

Miscellaneous discharges include desalination unit wastewater (005), blowout preventer fluid (006), boiler blowdown (007), fire control system test water (008), non-contact cooling water (009), uncontaminated ballast water (010), bilge water (011), excess cement slurry (012), and muds, cuttings, and cement at seafloor (013). Listed below is a general description of each discharge:

Desalination unit wastes consist of wastewater associated with the process of creating freshwater from seawater as defined by the permit. They generally consist of residual high-concentration brine similar to seawater in chemical composition.

Blowout preventer fluid means the fluid used to actuate hydraulic equipment on the blowout preventer.

Boiler blowdown, as defined by the permit, is the discharge of water and minerals drained from boiler drums. It is used to purge boiler circulation water to minimize solids build-up.

Fire control system test water is the water released during the training of personnel in fire protection, and the testing and maintenance of fire protection equipment as defined by the permit. It may contain corrosion inhibitors.

Non-contact cooling water is once-through seawater used to cool machinery at platforms.

Uncontaminated ballast water is seawater added or removed to maintain the proper ballast floater level and ship draft.

Bilge water is water that collects in the lower internal parts of the drilling vessel and must pass through an oil/water separator prior to discharge.

Excess cement slurry is the excess cement and wastes from equipment washdown after a cementing operation.

Muds, cuttings, and cement at seafloor means the materials discharged at the surface of the ocean floor in early phases of drilling operations, before the well casing is set and during well abandonment and plugging.

Each of these discharges will be monitored for no visible sheen and tested monthly.

7.0 General Best Management Practices

7.1 General Housekeeping

Good housekeeping means maintaining clean and orderly work areas. With good housekeeping, it is easy to move around work areas, materials and equipment are easy to locate and use, spills and leaks are reduced, and work areas are safer and healthier for workers. Good housekeeping practices include:

- orderly storage of chemicals and other materials
- designated areas for materials and activities
- proper labeling of areas, equipment, and materials
- prompt cleanup of spills and leaks
- drip pans or other devices to contain small material releases
- inspections to verify that practices are being implemented and to detect any problems needing attention

Segregation of domestic and hazardous waste will follow the waste management procedures in the Alaska OCS Environmental Compliance Manual. No overboard discharge of solid waste will take place during the Alaska exploration project. Domestic waste will be transferred to service vessels and disposed in approved landfills onshore. Recyclable hazardous waste such as absorbent pads, batteries, fluorescent lamps, and used oil will be segregated to the extent practical from other landfilled waste and shipped to onshore recycle centers.

The current Waste Management Program for Alaska operation lists recycling options whenever possible for OCS operations. The list of recycle waste includes the following:

- lubricating oil and filters
- spent organic solvents and miscellaneous chemicals, re-used on a case-by-case basis
- drilling additives
- scrap metal and drums

Good housekeeping practices for mud pits and the solids control system are described in later chapters of this plan.

7.2 Preventive Maintenance and Operation

Preventive maintenance and proper operation of equipment can reduce minor losses of materials from leaks and spills and minimize waste streams from treatment systems. Equipment that is maintained and operated properly will be cleaner and less prone to leaking, spilling and generating waste. Some preventive maintenance practices would also be considered good housekeeping (keeping valves and fittings from leaking, for example); however, this plan does not make a strict distinction between the two.

Skimmer Tanks and Oily Water Separators

There is a skimming tank on the rig for separating small amounts of water-based drilling fluids and/or oil from water that may enter the drains from the deck. Wastewater and mud spills are collected in this tank. After collection the WBM with mineral oil traces and/or oil is separated from the water by gravity separation. While stationary, static oil will separate from the water and float to the top of the system.

This allows the WBM with mineral oil residue and/or oil to be skimmed off and sent to the oil collection tank located in the port aft column of the rig.

There are also two oil-water separators on the rig. They are located in both the port aft columns and the starboard aft columns on Level 3. The oil collection tank is located directly below these separators. Spills from the pits, shakers, and pump room all drain into this separator system. Other sumps on the rig that could possibly contain oily water waste also feed it. Both the oil/water separators and the skim tanks are Coast Guard approved.

Lubricating Oil Purification Units

Lubricating oil purification units will be used to reduce engine oil change and oil filter replacement, reducing generated used oil volume. Replacement of conventional filters with reusable stainless steel filters or centrifugal filter units will generate only filtrate waste, thus eliminating conventional filter media from the waste stream.

Chemical Storage Areas

Additives and chemicals will be protected to minimize uncontrolled releases or potential weather impact. Particular attention will be given to loading and unloading dry or wet chemicals during operation. Standard procedure for chemical transfer includes securing the area and maintaining spill response equipment on hand during the operation.

Vacuum System

There is a vacuum system on the rig to collect spillage around the rig floor, the cuttings ditch, the gumbo box, the shale shakers, the pit room, the pump room, the sack room, and the deck areas. The fluid recovered is pumped into the solids recovery system and is processed so it can be returned to the active system.

Equipment Spillage and Leak Prevention

Combustion engine, pumps bearings, seals, and hydraulic equipment will be provided with drip pans and containment devices. Examples include drip pans beneath lubricating oil systems on engines, containment vessels or dikes under fuel and chemical storage areas. Regularly scheduled preventive maintenance on equipment, pumps, piping systems, hoses, and valves will reduce leaks or releases of chemicals to containment systems or to the environment. Daily inspection will ensure proper equipment operation and implementation of corrective action if required.

Pipe Dope

Only lead-free pipe dope will be used for tubing connections. A strict control program will be established to ensure proper application, container handling, and final disposal of excess dope material.

Cementing "O*n- the-Fly*"

Cementing work will be "on-the-fly" when possible, minimizing raw material and use of additives. This allows for the reuse of raw materials, reducing waste disposal.

Loss Drilling Mud

Drill pipe trips in and out of the hole can contribute to excess mud waste on the rig floor. The outer diameter of the pipe will be wiped clean as much as possible under safe conditions prior to pull out, reducing the mud and the need for rig wash.

7.3 Vessel Housekeeping

The Noble Safety Policy Manual (SPM) contains Standard Operating Procedures (SOPs) for vessel housekeeping operations. The following housekeeping, chemical and waste handling procedures will be utilized for other areas of the vessel not previously described:

- housekeeping (SPM-809)
- hazardous materials handling (SPM 704)
- containment of hydrocarbons and chemicals (SPM-901)
- drainage and discharge (SPM-902)
- spills (SPM-903)
- emissions (SPM-904)
- recycling and waste reduction (SPM-905)
- HSE assessments and audits (SPM-1001)

8.0 Documentation & Recordkeeping

NPDES BMP Plan Recordkeeping starts on the date and time when the last anchor is set at the location and continues until the last anchor is removed from the location.

8.1 Best Management Practice Documentation

A copy of this BMP Plan and its related documentation will be maintained by the facility operator and will be made available to EPA upon request. All NPDES Permit required BMP Plan records are retained in Shell's NPDES WBM Environmental Records Binder.

8.2 Associated Documentation and Manuals

Other documents or manuals that contain related pollution prevention measures include:

- NPDES Compliance and Procedures Manual
- Oil Discharge Prevention and Contingency Plan (ODPCP)
- Spill Prevention Control and Countermeasure Plan (SPCC)
- Alaska Area Waste Management Plan

All manuals are maintained at the facility and in Shell's Anchorage office.

8.3 Housekeeping Monitoring, Inspections and Records

Housekeeping monitoring includes visible observations (foam, floating solids, and sheen), flow rates, and sampling. Facility personnel follow standardized monitoring and sampling procedures related to each discharge. Housekeeping inspection reports of areas and equipment must be completed routinely during operations, maintenance, and repair.

General Housekeeping Inspection Reports (AKG28/29-BMP2) and records must be completed and kept as part of this BMP Plan and must be filed in the appropriate tab of the NPDES WBM Environmental Records Binder.

Rig Floor and Mixing Area Inspection Reports (AKG28/29-BMP3) and records must also be completed and kept as part of this BMP Plan and must be filed within the appropriate tab of the NPDES WBM Environmental Records Binder.

Drilling Foremen are responsible for inspections and maintaining inspection and preventative maintenance records, although they may delegate certain tasks to qualified individuals (e.g., compliance engineers, drilling contractors, rig floor and mixing area contractors, and mud pit and solids control equipment contractors).

Records must be completed and collected from the contractor that operates, maintains, and repairs the mixing and other equipment. These records are required by both the Arctic Oil and Gas Exploration NPDES General Permit and this BMP Plan and must be filed in the NPDES WBM Environmental Records Binder.

8.4 General Recordkeeping

Pursuant to permit regulations, records will be retained through the term of the permit or for a period of at least five years from the date of the sample, measurement, report, or application, whichever is longer. Records are maintained electronically and/or in hardcopy. This recordkeeping includes:

- copies of all reports required by the permit (DMRs, etc.)
- a copy of the NPDES permit
- records of all data used to complete the application for this permit
- original monitoring data, including operator routine duties (ORD), operator log books, electronic data capture, or other documents in which monitoring data such as sheen test results are first noted
- monthly facility flow tables
- all analytical data packages
- chain-of-custody forms
- logs or other documents used to originally record flow meter readings
- calibration and maintenance records of equipment as they relate to measurement of volume or monitoring quality
- NPDES-related training records

8.5 Reporting

Reporting includes written information contained in the DMR and/or in correspondence. In addition to the routine data submitted to Shell Regulatory Affairs Department and Shell Wells Group for compilation and reporting to EPA, the following sampling data must be reported to Shell each month:

- regular required monthly sampling results
- data from samples collected more frequently than required by permit
- in-house data that complies with EPA analytical method requirements

Documentation and records related to general issues, the mud pits, and the solids control system are listed in the tables below, in corresponding sections of the BMP Plan, and are filed in Shell's NPDES WBM Environmental Records Binder.

Table 8.1 Recordkeeping Tables

Recordkeeping for Discharges Associated with Cuttings
• Inspection / equipment maintenance / repair records for solid control equipment and their housekeeping
• Reportable spills of drilling mud/cuttings
• Training records related to BMPs

Recordkeeping for NPDES Discharges Not Associated with Cuttings
• Inspection / equipment maintenance / repair records for rig/drill floor
• Inspection / equipment maintenance / repair records for pumps & mixing areas
• Inspection / equipment maintenance / repair records for mud pits
• Inspection / equipment maintenance / repair records for fluid transfers
• Reportable spills of mud
• The Daily NPDES Record Form covering:
◦ Reportable deck drainage discharge
◦ Reportable sanitary and domestic waste
◦ Reportable desalination unit waste
◦ Reportable blowout preventer fluid
◦ Reportable boiler blowdown
◦ Reportable fire control system test water
◦ Reportable non-contact cooling water
◦ Reportable uncontaminated ballast water
◦ Reportable bilge water discharge
◦ Reportable cement slurry discharge
◦ Reportable test fluids discharge
• Training records related to BMPs

Recordkeeping for General Housekeeping
• Inspection records for general housekeeping
• Documentation regarding BMP (re-)evaluation
• Feedback records for BMP improvement

9.0 Mud Pits Best Management Practices

Mud pits (MP) are used to store and condition drilling fluid (mud). This BMP Plan covers processing, active, and reserve mud pits, as well as their piping for drilling fluid transfer, blending, and processing. An active mud pit feeds mud directly to the well bore. A reserve mud pit is used for mud additions to the active pit, as well as for storing excess mud from the active mud system.

Agitators are routinely used in mud pits to help keep solids in suspension. Without proper agitation, excessive mud solids can accumulate in dead spaces of a mud pit. Corners of rectangular mud pits experience low circulating velocity that allows some settling. Mud solids are very similar to drill cuttings and are composed of fine cuttings, barite, and clay particles. At the completion of the well, mud pits are emptied and cleaned. High-pressure wash water is used to dislodge and dilute solids for discharge overboard.

Mud pit and equipment cleaning methods shall minimize the potential for building up drill cuttings (including accumulated solids) in the active mud system and solids control equipment system.

These cleaning methods shall include, but are not limited to, the following general procedures:

- ensuring proper operation and efficiency of mud pit agitation equipment
- using mud gun lines during mixing operations to provide agitation in dead spaces
- pumping drilling fluids off drill cuttings (including accumulated solids) for use, recycle, or disposal before using wash water to dislodge solids

9.1 MP Good Housekeeping

Good housekeeping practices for mud pits should focus on minimizing solids buildup during operation and drilling mud discharges during cleanouts, cleaning up leaks and spills promptly, and inspecting work areas to detect any problems needing attention. Cleanup and other good housekeeping procedures incorporated by reference in this BMP Plan are listed in Section 11.0 Referenced Documents. General practices are listed in the table below.

Table 9.1 Good Housekeeping Mud Pits

Good Housekeeping Practices for Mud Pits
Surface Pits • A pressured water line will be used for general cleaning on and about the pit area, including the shaker and shaker screens. • Install adsorbent pads or mats at entry/egress points of the mud pit area to prevent the tracking of residues to other areas of the rig. **Subsurface Pits** • Follow written procedures for transferring and measuring volumes with sight-glass and agitating with internal gun lines. Cleanout procedures will require special entry permits and will be reviewed by a specific Job Safety Assessment (JSA) for the cleanout.

The rig is equipped with redundant alarm systems on the mud pit system. A float sensor reports pit levels to the driller's console through the HY-TEC system. There are also sonic sensors that send

information to the mud logger's console. Each pit and all lines are very clearly marked, and the discharge (dump) valves are all color-coded.

9.2 Mud Pit System

BMPs for mud pits focuses on securing valves, proper operation, minimizing discharges during pit cleaning, and general good housekeeping (see table in Section 11.0). Written procedures for mud pits that are incorporated by reference into this BMP Plan are listed in Section 11.0 Referenced Documents.

Active Pits

The "active" mud pit system contains 10 pits in a rectangular room directly adjacent to the mix/sack/pump room. The total pit volume available for WBM fluid in the active system is 3,286 total barrels (bbls). In addition, there are two cement pre-mix tanks each with a capacity of 359 bbls. These pits are located just outside the mud pit area beside the cementing unit. (Either or both can be used to store extra mud if desired.) Each of the pits in the active and reserve systems has sufficient agitation to limit solids buildup to a minimum.

The mud pits are fully enclosed in the pit room and have no exposure to the outside environment. Each of the pits has a sample point that facilitates the taking of samples for tests that must be conducted on the mud. Tests are performed at a sink that facilitates the cleaning of equipment after the tests are completed.

Sand Traps

The sand traps, which are located in a row parallel to and at the same elevation as the main pits (and upon which sit the shakers and various other solids control equipment), have no agitation or jetting capability. These pits are fully enclosed. Mud, returned by the flow line and processed through the shale shaker equipment, can be routed to the sand traps, which overflow into the return ditch and discharge to a mud pit or directly to the return ditch and from there to a mud pit. Opening/closing gates from the return ditch to the individual mud pits determine which mud pit receives the return flow.

Reserve Pits / Column Tanks

Storage tanks located in the columns are used for the storage and drilling fluids. Sight glasses are used to determine fluid volumes in these pits (as well as floats which report to the HY-TEC system on the driller console). Fluid volumes are pumped to/from these subsurface pits as "transfers" with specific control procedures. The column tanks have two agitators each, which facilitate proper mixing and agitation for fines suspension to reduce or eliminate solids buildup in the bottoms and corners of the tanks.

Pit Cleanout

Prior to placing mud in any surface pit, it is standard and necessary procedure to ensure the pit is clean. Because this typically involves the cleanout of the pit, and therefore the opening of the discharge (dump) valve to wash out residue, it is usually necessary to reseal the discharge (dump) valve to prevent leakage. Using the contractor procedures for resealing these discharge (dump) valves and maintenance of these valves ensures that there will be no leaks from the pits. Written procedures for pit cleaning can be found in Section 11.0 Referenced Documents.

After sealing the discharge (dump) valves, no monitoring system can detect if the valves may be leaking. Therefore, it is imperative to carefully monitor volumes in the pits after sealing to detect any leaks.

9.3 MP Equipment Maintenance and Operation

Equipment BMPs for mud pits focus on operation and equipment to minimize solids buildup and equipment controls to prevent leaks and spills. Equipment maintenance and operating procedures incorporated by reference in this BMP Plan are listed in Section 11.0 Referenced Documents. General practices are listed in the Table below.

Table 9.2 Maintenance and Operation for Mud Pits

Equipment BMPs for Mud Pits
General
• Secure discharge (dump) valves on all surface mud pits and water lines to the mud pit area during mud operations.
Operation
• Run agitators and mixers continuously when mud is in the pit.
• Evaluate solids buildup from pit cleanout to pit cleanout using the following scale: o Very Good (V): very little to no solids buildup in pit o Good (G): minimal buildup in corners and pit floor o Satisfactory (S): noticeable build-up of solids in corners and pit floor o Unsatisfactory (U): excessive build-up of solids
• Inspect paddle mixers to ensure no hydraulic oil leaking into mud.
Clean-Out
• Before cleaning out pit solids, pump off free WBM for use, recycle, or disposal as indicated in the NPDES permit, and vacuum remaining liquid. Follow valve-securing procedures before entering mud pit.
• Following opening of discharge (dump) valves, inspect and reseal according to proper procedures, with particular attention to potential leaking of the valve to volumes upon first refilling the tank.
Good Housekeeping
• For surface pits, use adsorbent mats at entry/egress points of the mud pit area to prevent the tracking of mud residues to other areas of the rig.
• Follow written procedures for transferring, measuring volumes, and agitation. Cleanout procedures will be reviewed by a specific JSA for cleanout.

9.4 MP System Inspections

Visual inspections of the mud pits will be conducted at least once a day when drilling. The daily inspection should be simple and cover either critical items or items that reflect overall conditions for the mud pits.

Inspections will be documented on printed inspection forms. Persons conducting the inspections must include the date of inspection and their signatures. Any problems requiring attention will be noted on the inspection form. Other inspection forms related to BMPs developed separately from this BMP Plan are incorporated by reference and listed in Section 11.0 Referenced Documents.

Mud Pit Inspection Reports (AKG28/29-BMP4) must be completed (Appendix A). Operation, maintenance, and repair records must be completed and maintained by the contractor that operates,

maintains, and repairs the mud pits. BMP forms should be filed in the corresponding tab of the NPDES WBM Environmental Records Binder.

The mud pit inspection report requires documenting the qualitative assessments of solids buildup from previous pit cleanout to current pit cleanout. The following scale should be used to assess solids buildup:

- Very Good (V): very little to no solids buildup in the pit
- Good (G): minimal buildup in corners and pit floor
- Satisfactory (S): noticeable buildup of solids in corners and pit floor
- Unsatisfactory (U): excessive buildup of solids

This assessment should be performed for each individual pit and an entry made for each pit on the AKG28/29-BMP4. Multiple entries may be made for each day if necessary.

Drilling Foremen are responsible for inspections and maintaining inspection and preventative maintenance records, although they may delegate certain tasks to qualified individuals (e.g., compliance engineers, drilling contractors, and mud pit and solids control equipment contractors).

10.0 Solids Control Equipment

This section describes the solids control equipment (SCE) used to separate formation cuttings from the drilling mud. Drilling mud is separated from the cuttings so that it can be reused and so that large amounts of WBM mud and water-based fluids are not discharged into the environment with the cuttings. A balance must be struck between the dryness of the cuttings (how much fluid is removed) and the carryover of fine solids in the mud, which degrades its quality.

The solids control system is used to maintain or modify drilling fluid properties as required by drilling conditions. Solids removal efficiency depends on the processing equipment and formation characteristics. The solids control system should try to achieve high solids removal efficiency, as dry solids as possible (when discharged), and an optimum cut point. Solids control equipment should be sized to handle the expected process rates for the drilling operation and produce the required quality of the drilling mud.

A solids control system which operates with high efficiency can reduce the drilling volume required to drill a given well, thereby minimizing the waste generated. A low efficiency results in high solids in the drilling fluid. This increases drilling torque and drag, increasing the tendency for stuck pipe, increased drilling fluid costs, and reduced well bore stability. The solids content and rheological properties of the drilling fluid can also be controlled by adding fresh drilling fluid or components to the mud system.

For a detailed description of the operating procedures and the (proactive) maintenance procedures of all of the solids control equipment, see the solids control equipment maintenance procedures referenced in Section 11.0 Referenced Documents.

The operation of solids control equipment should be consistent with the manufacturer's design criteria or recommendations. Equipment design and operation will depend on drilling fluid characteristics, mainly type, flow, density, and rheological properties. Recognizing that each drilling operation is unique, the solids control system should be designed and operated, to the extent practical, consistent with API RP 13C. The operation of the solids control system must be balanced between the amount of fine solids in the drilling fluid and the amount of drilling fluid retained on the discharged cuttings.

10.1 SCE Good Housekeeping

Good housekeeping practices for the solids control system should focus on keeping work areas clean and neat, performing preventative maintenance on equipment to minimize spills and leaks, cleaning up leaks and spills promptly, and inspecting work areas to detect any problems needing attention. Cleanup and other good housekeeping procedures incorporated by reference in this BMP Plan are listed in Section 11.0 Referenced Documents. General practices are listed in the table below.

Table 10.1 Good Housekeeping Solids Control Equipment

Solids Control Equipment Good Housekeeping Practices
• Keep work areas clean, neat, and accessible. • Store materials properly. • Be sure all transfer lines are clearly marked. • Conduct preventive maintenance on equipment, including major process units and their connections, pumps, and valves as outlined by the manufacturer. • Operate shakers properly to prevent mud overflow. • Keep floors clean and free of clutter and tripping hazards. • Keep sinks and work surfaces clean and neat. • Keep stairways clean, accessible, and free of tripping hazards. • Keep hoses clean and neatly /safely stored. • Have sufficient cleanup equipment and materials readily available. • Cleanup leaks and spills promptly. • Use vacuum to recover spills and leaks on floor. • After transferring bulk material from solids control pits, remove residual mud with vacuum or discharge according to the NPDES permit. • Conduct daily visual inspections to verify correct practices and detect problems, if any.

10.2 SCE Best Management Practices

This section addresses BMPs to minimize the amount of WBM-based drilling fluid adhering to drilled cuttings before discharge overboard and to maximize the recovery of drilling fluid for reuse. It also describes BMPs to minimize the potential for buildup of drill cuttings (including accumulated solids) in the active mud system and solids control equipment system.

Shale Shakers

Shale shaker design variables include the number of decks, type of motion, G-force, screen arrangement, and available screen area. The shaker design variables, together with the screen characteristics, control the efficiency of the cuttings separation and the length of time that the drilling mud and cuttings spend on the screen. Screen characteristics affecting the efficiency of cuttings separation include mesh, conductance, number of layers, type of construction, non-blanked area, and screen angles. Screens may be single, double, triple, or four-layer, bonded or non-bonded, flat or 3-dimensional (for example: corrugated). Screens may be sloped downward for faster movement or upward for slower movement. Shale shakers may be arranged in series or parallel. When used in series, the screens may be "stacked" or tiered one above the other (mud passing through the upper screen falls onto the screen below.

Shaker operating parameters include screen coverage (how much of the screen is covered by the incoming flow), screen tensioning, screen support, screen deck angle, G-force, vibrator assembly angle to screen deck, and flow distribution.

The table below lists general guidance for these parameters. Detailed written operating procedures incorporated by reference in this plan are listed in Section 11.0 Referenced Documents.

Table 10.2 BMP for Shaker Operation

BMP Guidance for Shaker Operation
• Screen tension should be maintained at the optimum torque for that shaker. Tension should be checked after 30 minutes of operation after installing new screens and daily thereafter.
• The screen deck angle should be maintained to manufacturer's recommendations during normal operation.
• Leave at least one butterfly valve (furthest from the flow line entry point) in the fully open position, and restrict valves to the other shakers as required to distribute flow evenly.
• Optimize screen coverage on the lower deck by maintaining a relatively small stream of fluid discharging with wet cuttings from the second screen onto the lower drying screen.
• All returns from the hole should be screened.
• Physically inspect the shaker area to monitor the operation of the shakers, inspecting screens for holes and tears and washing off screens of any caked or dried mud/solids.
• Visually monitor shaker area and adjust pumps to accommodate shaker conditions.

The table below lists general maintenance activities for shakers. Written maintenance procedures for this rig are incorporated by reference and listed in Section 11.0 Referenced Documents.

Table 10.3 BMP for Shaker Maintenance

BMP Guidance for Shaker Maintenance
• Maintain motors as per contractors PMI (see Section 11.0 Referenced Documents).
• Replace worn or damaged components as needed, including decking rubbers, decking strips, tension rails, springs, and screens (check for wear, tears, or abrasion).

Centrifuges

A centrifuge removes additional drilling fluid from separated cuttings. Any design of shale shaker can be used as a drying shaker. Drying shakers may be used to increase the separation and recovery of drilling fluid. Detailed written procedures, which are incorporated by reference in this plan, are listed in Section 11.0 Referenced Documents

Fines Removal Equipment

Fines removal equipment is necessary on the rig to remove drilled solids that are smaller than 70 microns in situations that necessitate it. The desander / mud cleaner contains cones designed to remove fines greater than 70 microns, and the desilter / mud cleaner is designed with cones to remove fines 30 microns and greater. Fluid properties and suspended solids properties (mainly size) determine which equipment is used to remove the fines. The centrifuge on the *Discoverer* used for fines removal will remove particles down to 5 microns. Varying the bowl speed varies the G-force applied to the fluid with this equipment.

General BMP guidelines for fines removal operation and maintenance are listed in the tables below. Written procedures incorporated by reference in this plan are listed in Section 11.0 Referenced Documents.

10.3 SCE Inspections

BMP Plan's recordkeeping begins on the date that the FIRST WBM activity regulated by this BMP Plan occurs on a well (Section 4.1). NPDES Recordkeeping requirements are in effect from that beginning date to the date all WBM is transferred off the facility. Solids Control Inspection Reports must be completed and shall include:

- SCE Housekeeping Inspection Report (AKG28/29-BMP5)
- Shale Shaker Inspection Report (AKG28/29-BMP6)
- Fines Removal Unit Inspection Report (AKG28/29-BMP7)

Additionally, operation, maintenance, and repair records must be completed and collected from the contractors that operate and maintain the individual components of the solids control system (shale shakers and cuttings equipment). BMP Forms must be filed in the corresponding tab of the NPDES WBM Environmental Records Binder.

Drilling Foremen are responsible for inspection and maintaining inspection and preventative maintenance records, although they may delegate certain tasks to qualified individuals (e.g., compliance engineers and mud pit and solids control equipment contractors).

11.0 Referenced Documents

Table 11.1 Documents Incorporated by Reference

Documents Incorporated by Reference in BMP Plan	
Document Title	**Relation to BMP Plan**
40 CFR 435	Federal requirements for BMP Plan and cuttings monitoring
NPDES Permit AKG 280000	BMP plan is a MANDATORY requirement in the Arctic Oil and Gas Exploration General NPDES Well Specific Permits.
Shell's NPDES WBM Environmental Records Binder	All Housekeeping Records, DMR Records, and Feedback reports to the BMP
OCS Environmental Compliance Manual	Segregation of domestic and hazardous waste management procedures
Shell Contingency Response Waste Management Plan for 2012	Addresses the different resources (vessel and other support) for waste management and disposal from spill response.
Solids Control Workshop Manual	Training document on solids control best practices
Shell Proactive Goals Program	Includes documentation on daily inspection of rig structure and equipment, which may be susceptible to environmental incidents (deck drains, bilges, oily water separators, sumps, and fuel oil containment pans)
JSA File (Pre-Job Safety Analysis Meeting Document)	Policies, procedures, and training documentation whenever there is a change in operations
Fuel Oil Transfer Procedures, Appendix A, Operations Manual	Transfer practices for liquid mud, and hose certification and testing requirements in accordance with 33 CFR 156.170
Operating Procedures for Transfer of Liquid Mud	Covers in detail four types of transfers: (1) Fluid take-on from boat; (2) Fluid transfer from rig to boat; (3) Fluid transfer from upper pits to lower pontoon tanks; (4) Fluid transfer from pontoon tanks to upper transfer pit
Rig Maintenance System	Equipment operation and maintenance guidelines, requirements, and tracking, for all equipment owned by Rig Contractor
API RP 13 C	Solids control equipment
Solids Control Maintenance & Best Management Practices manuals	Contains instructions for operation, maintenance, and Best Management practices of the Solids Control Equipment (e.g., shale shakers).
Fluids Supplier Maintenance & Best Management Practices manuals	Contains instructions for operation, maintenance, and Best Management practices of the Solids Control Equipment (e.g., cuttings dryer, centrifuge).
Shell's Waste Management Program	Lists recycling options for lubes & filters, spent organic solvents, drilling additives, and scrap metal and drums
Contractor Components Kit	Contains listing of all spare parts for solids control equipment
SHELL's Incident Reporting and Management Database (Fountain)	Contains records of all spill/release incidents
Rig Specific Sampling Plan	Sampling plan describing methods and procedures for collecting all permit-required samples
Rig Contractor Training Records	Training records for all contract rig personnel
Mud/Fluids Contractor Training Records	Training records for all fluids supplier personnel, including compliance engineers

Documents Incorporated by Reference in BMP Plan	
Solids Control Contractor Training Records	Training records for all solids control contract personnel
Shell's NOW Manifest Record	Non-hazardous Oilfield Waste monitoring
Quality Manual / Quality Assurance Project Plan (QAPP)	Contains policy statements, quality assurance procedures, quality control activities, and SOPs for sampling and testing
Drilling Fluid Plan	Contains information on the formulation and maintenance of the drilling fluid
Spill Response Plan	Outlines the action to be taken should a spill occur

Table 11.2 Documents Referenced in BMP

Documents Referenced in BMP Plan	
Document Title	**Relation to BMP Plan**
Noble Safety Manual	Contains policies and standard operating procedures for housekeeping and chemical handling / storage aboard vessel
Noble Garbage Management Plan	Contains some handling and storage procedures that are Marpol V compliant

12.0 BMP Committee

The BMP Committee is responsible for the development of this BMP Plan. It is also responsible for its implementation. The BMP Committee prepared the initial BMP Plan and is responsible for its continued review and modification. The BMP Committee is comprised of:

- Shell Drilling Superintendent — Jim Miller 1-907-646-7122
- Shell Drilling Team Lead — Chris Riley 1-832-337-1476
- Shell Drilling Supervisors — James Coston 1-504-728-0445; Loyd Wallace 1-504-728-5160
- Rig Offshore Installation Manager (OIM) — TBD (Noble employee)
- Shell AK HSE Team Lead — Lucy Jean 1-907-646-7116
- Shell AK RA Coordinator — Pauline Ruddy 1-907-771-7243
- Shell Fluids/Cement Team Leader — Kevin Kim 1-832-337-1686

The BMP Committee has delegated the actual work of preparing the BMP and overseeing its implementation to contractors. Ultimately, Shell's superintendent, Shell's drilling supervisors, and contractor OIM reviewed the BMP Plan and certified that it meets all applicable regulatory requirements. Other persons that are included in the BMP Committee are qualified individuals from the permittee's organization (Shell Regulatory Affairs Department, Shell Well Group, Fluids Team). These individuals have either direct responsibility or relevant knowledge related to this BMP.

13.0 BMP Development and Implementation

Development and implementation of the BMP Plan was based on requirements at 40 CFR 435 (Addendum B to Appendix 7 to Subpart A), guidance provided in EPA's "Guidance Manual for Developing Best Management Practices (BMP)" (EPA 833-B-93-004), and a review of the facility operations.

This facility has implemented a BMP system in conjunction with the required monitoring of all effluent discharges. The monitoring program is described in Section 5.0 Discharge Limits and Monitoring and Section 6.0 Specific BMPs for Waste Discharge.

As part of the implementation, a notice will be communicated to all employees affected by the BMP plan through the facility orientation process. In addition, the BMP policy statement itself will be posted in key rig locations.

Copies of NOI Notices and Transfer Notices can be found in Appendix B.

Implementation of the BMP plan is facilitated by the training described in Section 15.0 Training and Appendix C.

Schematics and vessel diagrams will be available electronically, by reference, or in hard copy in Appendix D.

14.0 BMP Plan Modification & Certification

14.1 Certification Requirements

It is understood that a BMP document needs to be certified and its management practices in effect prior to spudding the wells in the Chukchi Sea. The BMP must be certified for all discharges prior to operations.

14.2 Evaluation and Re-Evaluation

The BMP Plan reports and records must be routinely reviewed and evaluated to ensure that the BMP Plan is effective in achieving the general objective of preventing and minimizing the discharge of wastes to the receiving waters and complies with all other BMP Plan requirements. Timely record reviews performed as part of the monthly Discharge Monitoring Report (DMR) process will ensure that mud pit and solids control equipment continue to operate as designed.

This evaluation should be conducted by members of the BMP Committee during "Drill the Well On Paper (DWOP)" exercises and well After Action Reviews (AARs). These reviews occur in conjunction with equipment vendors and/or industry specialists.

BMP Committee Members should keep each other informed on the effectiveness of the BMP Plan by regular communication sessions (e.g., on location during regular pre-tower meetings, off location during DWOPs, and in morning meetings as warranted), discussing the benefits generated by executing the BMP Plan (e.g., cost savings generated, reduced waste generator, etc.) and the need for BMP re-evaluation and modification.

14.3 Annual Review

The BMP Plan is reviewed no less than annually by the BMP Plan Committee and updated as needed. Upon updating, a revised copy is forwarded to the facility, and Shell Regulatory Affairs Department representative contacts the facility Drilling Engineer to review and discuss the BMP Plan updates. Shell Regulatory Affairs Department representative visits the facilities not less than annually and, with the Drilling Engineer or designee, trains the facility personnel on the BMP Plan and associated updates. Representatives from Shell Regulatory Affairs Department may assist with the training by creating audiovisual presentations.

14.4 Modifying the BMP Plan

This BMP Plan will be modified whenever there is a change in the facility or in the operation of the facility that significantly increases the generation of wastes or their uncontrolled release or potential release to the receiving waters. Contact your Shell Regulatory Affairs Department, Drilling Engineer, and Cement Team Leader when the BMP Plan warrants modification. At a minimum, the BMP Plan will be reviewed prior to adding a new well to the BMP Plan and modified if warranted.

BMP Plan Modification Requirements

Modifications to the BMP Plan must be consistent with the applicable requirements for BMPs in the NPDES General Permit 280000 and 40 CFR 435 for the Alaska Beaufort and Chukchi Seas.

All changes to the BMP Plan must be reviewed in accordance with the requirements specified in Section 14.0 BMP Plan Modification.

The BMP Plan must be recertified (i.e., a new certification page signed by the appropriate authority) if the BMP warrants modification. All modifications must occur within 14 days of the incident or facility change that materially increases the generation of wastes or their potential release to the receiving waters, with the exception of General Permit modifications. Modifications triggered by permit modifications must be certified and implemented within three months of the permit issuance.

Contact your Shell Regulatory Affairs Department and the Drilling Engineer, as well as the Cement Team Leader IMMEDIATELY when the BMP Plan warrants evaluation and possible modification.

At a minimum, the BMP Plan will be reviewed during DWOPs prior to adding a new well to the BMP Plan, and when warranted, the BMP Plan will be modified prior to recertifying the BMP Plan.

14.5 Feedback Records and Continuous Improvement

All staff involved in the drilling operations at the *Discoverer* are given the opportunity to further improve the BMP towards the goal of minimized discharge. A standard BMP Feedback Report has been developed (AKG28/29-BMP1). Feedback is to be given to the foreman on duty and will be kept as a part of the BMP documentation, to be considered during a standard BMP review or sooner if warranted. Questions regarding feedback can be directed to any of the BMP committee members.

Feedback reports are collected in this part of the BMP plan and must be filed in the Shell's NPDES WBM Environmental Records Binder. They are to be used as guidance for BMP Plan improvement.

14.6 Recordkeeping for Plan Modifications

All documentation will be kept as a part of the BMP documentation filed in Shell's NPDES WBM Environmental Records Binder and will be available upon request by the EPA or the BOEM.

14.7 Spill Prevention and Response Plans

Minor spills and leaks of drilling mud to the drill floor that do not reach the receiving waters are handled by good housekeeping cleanup procedures. Spills of water-based drilling fluids or chemical residue that reach the receiving waters are addressed in Section II of the Alaska OCS Environmental Compliance Manual and in spill response or contingency plans. Spill Prevention and Response Plan procedures that are incorporated by reference in this BMP Plan are listed in Section 11.0 Referenced Documents.

15.0 Training

Field personnel are made aware of NPDES related activities with the goal of pollution prevention and waste minimization. Having qualified personnel that have participated in training activities will ensure the efficient and effective operation of treatment systems that will ultimately minimize the risk of pollutants discharged to the Chukchi Sea. In accordance with EPA Guidance Manual for Developing Best Management Practices, the focus of the BMP Plan training is to ensure an understanding of the BMP Plan, including the reasons for developing the Plan, the positive impacts of the Plan, and employee and managerial responsibilities under the Plan.

15.1 Training Programs

An overview is given of the training programs provided by Shell and its contractors on the *Discoverer* to all individuals involved in the Exploration Program.

Note that training involves individuals of all levels of responsibility. The table below gives an overview of initial training programs developed and executed to date. Training will be established after the BMP is approved and signed by the Shell drilling team manager.

The Tier 1 level of training is a high-level overview of the types of regulatory programs that are applicable to our operations, a high-level description of the mitigation measures that are required, and general reporting structure. This series is intended to provide a general familiarity of the programs that employees and contractors must adhere to. For example, remote personnel and department leads would benefit from taking this training.

The Tier 2 level of training provides a greater level of awareness regarding each permit/authorization/ agreement. This training will provide a working knowledge of the permit but will not provide an in-depth description of each permit requirement. This training is anticipated to take about four hours.

The Tier 3 level of training is intended for those with specialized duties and for those who need to know the details of particular permits, sampling requirements, reporting requirements, etc. It is likely that most individuals will only need to attend a few of the Tier 3 trainings.

Table 15.1 Training Programs

Training Programs for BMP Management			
Program	**Administered by**	**Subjects Covered**	**Target Audience**
BMP Training	Shell, Noble and/or fluids contractor	1. Review of NPDES permit 2. WBM sampling & monitoring 3. BMP policy & implications 4. Best practices for all discharge equipment.	All personnel affected by the BMP

Training Programs for BMP Management			
AK ECM Training	Shell, Noble and/or fluids contractor	1. Modification to Environmental Compliance Manual (ECM) 2. Electronic (Livelink) documentation 3. Compliance sampling & testing 4. WBM monitoring & reporting 5. BMP development & application	Drilling managers, superintendents, engineers, foremen, HSE technicians, mud & compliance engineers
Compliance Engineer Training & Certification	Shell, Noble and/or fluids contractor	1. BMP documentation & reporting WBM and all regulated discharges	Mud engineers, HSE technicians, and compliance engineers
Solids Control Professional Training	Shell, Noble and/or fluids contractor	Modules including: 1. Solids control core competency 2. Practical solids control	Service & maintenance technicians

Training will include material handling, equipment maintenance and repair, cleanup, inspections, and record keeping. Specific training topics on BMPs for all discharge equipment are listed in the table on the following page.

Training Topics									
Topic	**Detail for Solids Control**	**Detail for Mud Pits**	**Rig Floor**	**Pumps & Mixing Areas**	**Fluid Transfers**	**Marine Sanitation Device**	**Oil Water Separator**	**Desalination Unit**	**Misc Discharges**
Waste minimization	• Balance between cuttings retention and fines buildup • Isolate area prior to maintenance or repair • Drain mud prior to maintenance or repair, preventing contamination of mud that would make it non-reusable • Alternative technology to reduce cuttings retention	• Preventing contamination of drilling fluids that would make it non-reusable • Remove drilling fluid before washing out pit solids • Recovery and reuse of drilling fluids • Referenced lock-out/tag-out procedures	• Mud loss during connections and tripping • Contamination of Mineral Oil Pill, making it non-reusable	• Contamination by Mineral Oil Pill, making it non-reusable • Recover / recycle during maintenance / repair of mud pumps • Isolation valves close to centrifugal pumps • Hopper valve control • Referenced lock-out / tag-out procedures • Handling WBM chemicals and additives • Cleanout before maintenance and repair	• Monitoring of transfers • Valves and master dump line control • Air blowdown • Vacuum break	• Proper operation • Marine biodegradable toilet paper • Use cleaners compatible with system			
Equipment	• Proper sizing design and review • Manufacturers recommendations for operation • PMI requirements	• Valve function and labeling • Agitation to keep mud mixed • Mud guns • Motors	• Mud circulation system • Preventive maintenance • Repairs	• Change out of swab / liners of mud pumps • Pump packing maintenance • Materials compatible with drilling fluids	• Compatible hoses and connections testing	• Properly sized for population • Manufacturer's recommended operation practices			
Spill and leak containment	• Contingency plan for onboard spills • Spill reporting	• Referenced spill plan for spills into marine environment • Contingency plan for onboard deck spills	• Grating system with drip pan • Contingency plan for onboard spills • Spill reporting	• Referenced spill plan for spills into marine environment • Contingency plan for onboard deck spills	• USCG regulations involving transfer boats • Referenced spill plan for transfers to/from supply vessels • Contingency plan for onboard spills • Spill reporting • Secondary containment at connection points • Volume balances (boat and rig)	• Identify potential sites for spills or leaks • Visually inspect joints and piping	• Identify potential sites for spills or leaks • Visually inspect joints and piping	• Identify potential sites for spills or leaks • Visually inspect joints and piping	• Identify potential sites for spills or leaks • Visually inspect joints and piping

Training Topics									
Topic	**Detail for Solids Control**	**Detail for Mud Pits**	**Rig Floor**	**Pumps & Mixing Areas**	**Fluid Transfers**	**Marine Sanitation Device**	**Oil Water Separator**	**Desalination Unit**	**Misc Discharges**
Cleanup	• Removal of mud residue	• Spills outside pit system • Removal of solids buildup	• Vacuum • Absorbent pads • Steam and pressure cleaners	• Rig or boat deck	• Spills on rig or boat deck				
Inspections	• Routine visual inspections • Problem reporting and correcting • Fines buildup • Equipment wear • Leaks • Inspection forms	• Solids buildup • Routine visual inspections • Problem reporting and correcting • Inspection forms	• Routine visual inspections • Problem reporting and correcting • Inspection forms	• Routine visual inspections • Problem reporting and correcting • Inspection forms • Leak detection • Pump packing	• Hoses and connections • Drilling fluids and WBM storage area and mud pits				
Monitoring	• Mineral Oil Pill retention on cuttings (if performed in conjunction with BMP Plan)	NA	NA	NA					
Recordkeeping	• Fluid volumes and quality • Fluid recovered and discharged • Inspections • Equipment maintenance and repair • Training	• Inspections • Equipment maintenance and repair • Training	• Inspections • Equipment maintenance and repair • Training	• Inspections • Equipment maintenance and repair • Training	• Inspections • Equipment testing and certification • Equipment maintenance and repair • Training	• Inspections • Equipment maintenance and repair • Training	• Inspections • Equipment maintenance and repair • Training	• Inspections • Equipment maintenance and repair • Training	

15.2 Training Records

Training records for this BMP are kept on Form AKG28/29-BMP9. Records for Shell employees and its Mud Pit and Solids Control Equipment Contractors that show all personnel affected by this BMP plan were trained on its requirements are found in the Environmental Records Binder. Original and current training records are maintained by Shell and Shell's Contractors.

Drilling Foremen are responsible for maintaining training records, although they may delegate certain tasks to qualified individuals (e.g., HSE technician, compliance engineer). Prior to and during the drilling of each new well, the Drilling Foreman must ensure that personnel affected by this BMP have been trained on its requirements and document the training on GMG 28/29-BMP9.

16.0 Discharge During Equipment Failure & Repair

16.1 Discharge during Regular Drilling Operations

During regular drilling operations, WBM and drilling fluids discharge points will be limited to either one, discharge from the shale shakers and mud cleaner exclusively, or two, discharge from the mud cleaner system and a fines removal unit, being either a mud cleaner or a high-speed centrifuge. With more than one fines removal unit in operation, discharge will be limited to discharge from a single fines removal unit while discharges from the other units in operation will either be routed to the centrifuges or managed under NPDES permit conditions.

Notify the Shell Regulatory Affairs Department and the Drilling Fluids and Cement Team Leader IMMEDIATELY when:

- excess WBM and fluids are over the established limits, OR
- discharge monitoring has to resume for any reason (i.e., out of compliance with other requirements of the BMP Plan), OR
- any one piece of equipment breaks down multiple times during drilling. An engineering review and analyses of the problem may be warranted.

Depending upon the circumstances, the BMP Plan may require modification within 14 days in accordance with NPDES permit requirements.

REMINDER: Non-Aqueous Fluids NOT ASSOCIATED WITH CUTTINGS (**whole SBM**) are a PROHIBITED DISCHARGE under the NPDES Permits. For detailed information on the NPDES Permit's Discharge Limitations and Prohibitions, see Section III Drilling and Workover Operations of the AKOCS ECM and this BMP Plan Section 5.0 Discharge Limits.

16.2 Discharge During Equipment Failure (Repair)/Servicing (Preventative Maintenance)

Non-crucial equipment for managing solids control and minimizing retention on cuttings are shale shakers and fines removal units (mud cleaner & high-speed centrifuge). Crucial equipment for managing solids control and minimizing retention on cuttings are the centrifuge and the cuttings transport system.

Scenario 1: Routine Preventative Maintenance Procedure or Repair WITH Parts and Repair Person Onsite

A routine preventative maintenance procedure or repair is performed on the centrifuge dryer with parts from the facility's spare parts kit and with onsite personnel:

Discharge and WBM Monitoring Options:

- The facility can discharge WBM and cuttings over the shaker without monitoring for the time it takes to complete the preventative maintenance procedure or repair, OR
- The facility can resume discharge monitoring until the preventative maintenance or repair is completed, OR
- The facility can go to ZERO DISCHARGE rather than discharging mineral oil laden mud and cuttings over shakers.

All WBM and cuttings discharges and equipment downtime must be reported on the appropriate AKG28/29-BMP form for the specific piece of equipment.

Scenario 2: Routine Preventative Maintenance Procedure or Repair WITHOUT Parts and Repair Person Onsite

A routine preventative maintenance procedure or repair on the centrifuge dryer system can be performed with the parts and personnel on deck. However, if a specific part or the repair person is not available and has to be flown in to complete the repair:

Discharge Monitoring Options:

- The facility can discharge WBM and cuttings over the shaker but must monitor drilling fluids while discharging over the shakers. Discontinue drilling fluids monitoring after SCE repair is completed and after discharge of WBM and cuttings is once again routed through SCE prior to discharge, OR
- Go to ZERO DISCHARGE rather than discharging WBM and cuttings over shakers and monitoring ROC.

All drilling fluids and cuttings discharges and equipment downtime must be reported on the appropriate AKG28/29-BMP form for the specific piece of equipment.

Scenario 3: BMP Plan Modification

If any of the situations in Section 16.1 occur, contact the Shell Regulatory Affairs Department. Depending upon the circumstances, the BMP Plan MAY require modification within 14 days in accordance with NPDES permit requirements.

Example: The facility is operating under a Certified BMP Plan and exceeds discharge of drilling fluids at the end of the first third of the interval drilled with Mineral Oil Pill or crucial SCE equipment (i.e., centrifuge – note a combination of centrifuge and desilter system is used on the Discoverer) must be redesigned and\or replaced with new equipment that has to be brought in.

Discharge Options and ROC Monitoring:

- Continue to operate under the certified BMP Plan through the end of the entire interval drilled with drilling fluids, AND
- Monitor drilling fluids from the point of crucial SCE breakdown through the end of the entire interval drilled with drilling fluids.
- Go to ZERO DISCHARGE rather than discharging Mineral Oil Pill residue and cuttings over shakers and monitoring drilling fluids.

All WBM and cuttings discharges and equipment downtime must be reported on the appropriate AKG28/29-BMP form for the specific piece of equipment.

Shale Shaker

In case of failure or servicing of a **shale shaker**, the unit will be taken off-line and flow will be diverted to the remaining shale shakers in operation. Discharge from the shaker may resume after it has been fixed/serviced.

Mud Cleaner

In case of failure or servicing of a **mud cleaner**, this unit will be taken off-line and any direct discharge from this unit will cease. Discharge will continue from the high-speed centrifuge. Discharge from the

mud cleaner may resume after it has been fixed/serviced. Cuttings will largely be mushy gumbo with some degree of inhibition from the PHPA polymers.

High-Speed Centrifuge

In case of failure or servicing of a **high-speed centrifuge**, this unit will be taken off-line and any direct discharge from this unit will cease. For optimum solids control, it may be necessary to route the effluent of the centrifuge to the mud cleaner for processing with concomitant discharge of fine. Discharge from the high-speed centrifuge may resume after it has been fixed/serviced.

16.3 Detailed Contingency and Zero Discharge Plan: Shakers

PREVENTATIVE MAINTENANCE OF ALL SOLIDS CONTROL EQUIPMENT (SCE) MUST BE PERFORMED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AS DEMONSTRATED BY THE PREVENTATIVE MAINTENANCE RECORDS OF THE CONTRACTOR RESPONSIBLE FOR OPERATING, MAINTAINING, AND REPAIRING THE SCE.

*This requirement and those specified in Section 14 must be verified prior to discharging drilling fluids and cuttings over shakers when equipment is being routinely maintained or repaired.

16.4 Equipment Failure/Zero Discharge Records

Contingency Plan Records

Contingency Plan records for SCE are found in the Drilling Contractor, Fluid Transfer Contractors, Mud Contractor, and Solids Control Equipment Contractor's preventative maintenance records and GMG28/29-BMP Inspection Forms.

Zero Discharge Records

Copies of Zero-Discharge Records (e.g. Non-Hazardous Oilfield Waste (NOW) Manifests, such as UIC-28 Forms must be kept in the Shell's NOW Manifest Record file.

17.0 Drilling Fluids Material Safety Data Sheets

Material Safety Data Sheets (MSDS) for all drilling fluids used on the rig can be found in the rig's MSDS binder or in the Shell online MSDS System. The MSD Sheets are hereby incorporated by reference.

APPENDIX A
BMP FORMS (BLANK)

AKG28/29-BMP1	BMP FEEDBACK REPORT
AKG28/29-BMP2	GENERAL HOUSEKEEPING INSPECTION REPORT – PAGE 1
AKG28/29-BMP2	GENERAL HOUSEKEEPING INSPECTION REPORT – PAGE 2
AKG28/29-BMP3	RIG FLOOR & MIXING AREAS INSPECTION REPORT
AKG28/29-BMP4	MUD PIT INSPECTION REPORT
AKG28/29-BMP5	SCE HOUSEKEEPING INSPECTION REPORT
AKG28/29-BMP6	SHALE SHAKER INSPECTION REPORT
AKG28/29-BMP7	FINES REMOVAL UNIT INSPECTION REPORT

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AKG28/29-BMP1 BMP FEEDBACK REPORT	(Evergreen)

Operator (Permittee Name)	Shell Gulf of Mexico, Inc.	Well Name / Number		OCS-Y Number	
Operator (Permittee Name) Address	3601 C Street, Suite 1000 Anchorage, Alaska 99503	Surface Area / Lease Block		NPDES (Well Specific) Permit Number	
Rig Name / Number		Spud Date			

Entry No.	Date of Feedback (mm/dd/yy)	Time of Feedback (hr:min)	Depth (MD, ft)	Feedback on BMP / Ideas for BMP improvement	Name of individual providing feedback	Roles & responsibilities of individual providing feedback	Signature of individual providing feedback
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NOTE: File in NPDES WBM ERB.			
Foreman's Signature/Date		Foreman's Signature/Date	

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AKG28/29-BMP2 GENERAL HOUSEKEEPING – Page 1	(Evergreen)

Operator (Permittee Name)	Shell Gulf of Mexico, Inc.	Well Name / Number		OCS-Y Number	
Operator (Permittee Name) Address	3601 C Street, Suite 1000 Anchorage, Alaska 99503	Surface Area / Lease Block		NPDES (Well Specific) Permit Number	
Rig Name / Number		Spud Date			
Name Inspector 1		Name Inspector 2		Inspectors' Affiliation	

Entry No.	Date of Inspection (mm/dd/yy)	Time of Inspection (hr:min)	Depth (MD, ft)	Are work areas neat, clean, accessible ? (Y/N)	Are floors clean, free of clutter & tripping hazards ? (Y/N)	Are sinks and work surfaces clean & neat ? (Y/N)	Are stairways clean, accessible and free of tripping hazards ? (Y/N)	Are hoses in good condition, clean and safely stored ? (Y/N)	Are sufficient clean-up equipment and materials readily available ? (Y/N)	Are materials stored properly ? (Y/N)	Are transfer lines clearly marked ? (Y/N)	Are "De Minimis'" discharges pro-actively minimized ? (Y/N)*	Are leaks, drips & spills on the deck cleaned up promptly ? (Y/N)*	Is the vacuum system used to recover spills & leaks on floor ? (Y/N)*	Is residual mud removed from the vacuum system after transfer of bulk material from pits ? (Y/N)*	Remarks / Corrective actions taken	Inspector Initials
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NOTE: Fill in ALL blank cells. Remarks/Corrective Actions Taken column must be completed for all cells answered No

By signing this form, you are certifying that Reported information is true, accurate, and complete. Under federal law, penalties can be assessed for Reporting false information including fines and imprisonment.

Inspector 1 Signature/Co./Date		Inspector 2 Signature/Co/Date	
Foreman's Signature/Date		Foreman's Signature/Date	

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AKG28/29-BMP2A GENERAL HOUSEKEEPING – Page 2	(Evergreen)

Operator (Permittee Name)	Shell Gulf of Mexico, Inc.	Well Name / Number		OCS-Y Number	
Operator (Permittee Name) Address	3601 C Street, Suite 1000 Anchorage, Alaska 99503	Surface Area / Lease Block		NPDES (Well Specific) Permit Number	
Rig Name / Number		Spud Date			
Name Inspector 1		Name Inspector 2		Inspectors' Affiliation	

Entry No.	Date of Inspection (mm/dd/yy)	Time of Inspection (hr:min)	Chemical Storage Area Clean\ Proper labels? (Y/N)	Holding Tanks areas neat, clean, accessible? (Y/N)	Kitchen sinks grease removed? Kitchen / Showers clean ? (Y/N)	MSD – Placards, piping, good working order? (Y/N)	Deck Drainage containers clean, adequate? (Y/N)	Desalination Unit maintained, working? (Y/N)	Boiler –clean, working, discharge needed? (Y/N)	Non-Contact Cooling Water –discharge area clean, monitored? (Y/N)	BOP Fluids – area monitored, discharged planned? (Y/N)	Bilge – area monitored, discharged planned? (Y/N)	Excess Cement Slurry – area monitored, discharged planned? (Y/N)	Fire Control – area monitored, discharged planned? (Y/N)	Remarks / Corrective actions taken	Inspector Initials
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Inspector 1 Signature/Co./Date		Inspector 2 Signature/Co/Date	
Foreman's Signature/Date		Foreman's Signature/Date	

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AKG28/29-BMP3 RIG FLOOR & MIXING AREAS	Weekly when using WBM

Operator (Permittee Name)	**Shell Gulf of Mexico, Inc.**	**Well Name / Number**		**OCS-Y Number**	
Operator (Permittee Name) Address	**3601 C Street, Suite 1000 Anchorage, Alaska 99503**	**Surface Area / Lease Block**		**NPDES (Well Specific) Permit Number**	
Rig Name / Number		**Spud Date**			
Name Inspector 1		**Name Inspector 2**		**Inspectors' Affiliation**	

Inspection Report				Rig Floor Inspection Items						Pump & Mixing Area Inspection Items							
Entry No.	**Date of Inspection (mm/dd/yy)**	**Time of Inspection (hr:min)**	**Depth (MD, ft)**	**Is any excessive mud on the rig floor cleaned up promptly? (Y/N)**	**Is picked up mud being recycled (Y/N) ?**	**Are mud collection devices used (drip pans, mud bucket, wipers, etc.)? (Y/N)**	**Are trip tank valves and alarms properly set and operated ? (Y/N)**	**Are floor drains plugged when not cleaning up ? (Y/N)**	**Are proper connection procedures being used ? (Y/N)**	**Is any excessive mud in pump and mixing areas cleaned up promptly ? (Y/N)**	**Are mud collection pans cleaned out ? (Y/N)**	**If not in use, are valves closed (mixing hoppers, etc.) ? (Y/N)**	**Is the flex hose in good condition ? (Y/N)**	**Are mixing areas and sack room dry, clean, and neat ? (Y/N)**	**Is wastewater removed before repairs ? (Y/N)**	**Remarks / Corrective actions taken**	**Inspector Initials**
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Inspector 1 Signature/Co./Date		**Inspector 2 Signature/Co./Date**	
Foreman's Signature/Date		**Foreman's Signature/Date**	

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AKG28/29-BMP4 MUD PIT INSPECTIONS	Weekly when using WBM

Operator (Permittee Name)	**Shell Gulf of Mexico, Inc.**	**Well Name / Number**		**OCS-Y Number**	
Operator (Permittee Name) Address	**3601 C Street, Suite 1000 Anchorage, Alaska 99503**	**Surface Area / Lease Block**		**NPDES (Well Specific) Permit Number**	
Rig Name / Number		**Spud Date**			
Name Inspector 1		**Name Inspector 2**		**Inspectors' Affiliation**	

Inspection Checklist				General			Operation		Clean-Out						Housekeeping			
Entry No.	**Date of Inspection (mm/dd/yy)**	**Time of Inspection (hr:min)**	**Depth (MD, ft)**	**Are all signs, pit markings, and pipe markings visible and clean ? (Y/N)**	**Are dump valves secured when not in use ? (Y/N)**	**Are water lines secured when not in use ? (Y/N)**	**Are agitators and mixers run continuously when mud in pit ? (Y/N)**	**Are paddle mixers not leaking hydraulic oil into mud ? (Y/N)**	**During clean out, are pits pumped off and vacuumed properly ? (Y/N)**	**Are dump valves inspected and resealed according to proper procedures ? (Y/N)**	**Are solids prevented from building up from pit clean out to pit clean out ? (Y/N)**				**Is cleanup equipment adequate – adsorbent mats in pit areas (Y/N)**	**Are procedures / JSA's followed for transferring, measuring volumes, and agitation? (Y/N)**	**Remarks / Corrective actions taken**	**Inspector Initials**
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Inspector 1 Signature/Co./Date		**Inspector 2 Signature/Co./Date**	
Foreman's Signature/Date		**Foreman's Signature/Date**	

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AKG28/29-BMP5 SCE INSPECTIONS	Weekly when using WBM

Operator (Permittee Name)	Shell Gulf of Mexico, Inc.	Well Name / Number		OCS-Y Number	
Operator (Permittee Name) Address	3601 C Street, Suite 1000 Anchorage, Alaska 99503	Surface Area / Lease Block		NPDES (Well Specific) Permit Number	
Rig Name / Number		Spud Date		Total Downtime (hrs)	
Name Inspector 1		Name Inspector 2		Inspectors' Affiliation	

Entry No.	Date of Inspection (mm/dd/yy)	Time of Inspection (hr:min)	Depth (MD, ft)	Are all necessary process units in operation & functioning properly ? (Y/N)	Is fluid routing / piping to various process units and discharge points correct ? (Y/N)	Is the equipment up to date on preventive maintenance (e.g. process units, connections, pumps) ? (Y/N)	Is the condition of the possum belly OK (verify by dumping at least one header to the lower screen deck, and observing) ? (Y/N)	Are there unusual noises from shakers or centrifuges that suggest a problem ? (Y/N)	Are shakers operated properly to prevent any mud overflow (see also Shaker Inspection Form) ? (Y/N)	Are subsequent screens (scalper -> shaker -> mud cleaner) sized to prevent near-size plugging ? (Y/N)	Are augers cover plates in the proper positions? (Y/N)	Is there spillage on the deck below the augers ? (Y/N) If so, take immediate remedial action	Are collection tanks (e.g. centrifuge tank) not over-filled ? (Y/N)	Is API system performance (measuring solids control efficiency) being determined and Reported on daily mud report ? (Y/N)	Remarks / Corrective actions taken	Inspector Initials
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Inspector 1 Signature/Co./Date		Inspector 2 Signature/Co./Date	
Foreman's Signature/Date		Foreman's Signature/Date	

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AKG28/29-BMP6 SHALE SHAKER INSPECTIONS	Weekly when using WBM

Operator (Permittee Name)	Shell Gulf of Mexico, Inc.	Well Name / Number		OCS-Y Number	
Operator (Permittee Name) Address	3601 C Street, Suite 1000 Anchorage, Alaska 99503	Surface Area / Lease Block		NPDES (Well Specific) Permit Number	
Rig Name / Number		Spud Date			
Name Inspector 1		Name Inspector 2		Inspectors' Affiliation	

Entry No.	Date of Inspection (mm/dd/yy)	Time of Inspection (hr:min)	Depth (MD, ft)	Are shakers operating optimally – no noises, no holes or bypasses in screens etc. ? (Y/N)	Are shakers monitored by remote camera and are pumps adjusted for shaker conditions (e.g. screen blinding) ? (Y/N)	Is flow evenly distributed across shakers ? (Y/N)	Is the butterfly valve furthest from the flowline entry point in fully open position ? (Y/N)	Are at least two shakers running while tripping ? (Y/N)	Is screen tension maintained at 40-50 ft-lbs ? (Y/N)	Is screen deck angle varying between -2° to +2° during normal operation ? (Y/N)	Is screen coverage on lower deck optimized by small stream of fluid discharging with wet cuttings from second screen onto lower drying screen? (Y/N)	Is screen use tracked on board in mud room and by shaker screen tracking sheets ? (Y/N)	Are motors maintained as per contractor PMI ? (Y/N)	Are worn / damaged components (torn screens, damaged rubbers, strips, tension rails, springs) replaced ? (Y/N)	Remarks / Corrective actions taken	Inspector Initials
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NOTE: Fill in ALL blank cells. Remarks/Corrective Actions Taken column must be completed for all cells answered No.

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Inspector 1 Signature/Co./Date		Inspector 2 Signature/Co./Date	
Foreman's Signature/Date		Foreman's Signature/Date	

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AKG28/29-BMP7 FINES REMOVAL UNIT INSPECTIONS	Daily when centrifuge is operating

Operator (Permittee Name)	Shell Gulf of Mexico, Inc.	Well Name / Number		OCS-Y Number	
Operator (Permittee Name) Address	3601 C Street, Suite 1000 Anchorage, Alaska 99503	Surface Area / Lease Block		NPDES (Well Specific) Permit Number	
Rig Name / Number		Spud Date		Total Downtime (hrs)	
Name Inspector 1		Name Inspector 2		Inspectors' Affiliation	

Entry No.	Date of Inspection (mm/dd/yy)	Time of Inspection (hr:min)	Depth (MD, ft)	Can discharge be routed to cuttings dryer or to cuttings box for zero discharge ? (Y/N)	Have the effluent centrifuge feed line, solids discharge chute and bowl cover been checked for solids build-up) ? (Y/N)	Have the bowl gaskets been checked for wear and cuts? (Y/N)	Have the belts been checked for wear and proper tensioning ? (Y/N)	Has the feed tube been checked for erosion and wear ? (Y/N)	Does the centrifuge processing tank show any indications of overflowing? (Y/N)	Is the feed rate for the centrifuges appropriate (e.g. per manufacturer spec's) ? (Y/N)	Are there any rumbling or beating sounds from the centrifuges? (Y/N)	Are bearings greased at least daily while operating or manu-facturer's recommendation followed ? (Y/N)	Are motors maintained as per manufacturer's spec's ? (Y/N)	Is the torque limit device operational ? (Y/N)	Are centrifuges and processing tank cleaned out during shut down ? (Y/N)	Remarks / Corrective actions taken	Inspector Initials
1.																	
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NOTE: Fill in ALL blank cells. Remarks/Corrective Actions Taken column must be completed for all cells answered No.

By signing this form, you are certifying that Reported information is true, accurate, and complete. Under federal law, penalties can be assessed for Reporting false information including fines and imprisonment.

Inspector 1 Signature/Co./Date		Inspector 2 Signature/Co./Date	
Foreman's Signature/Date		Foreman's Signature/Date	

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